Carrier®
HEATING & COOLING

31KAX
Electronic Air Cleaners

Installation, Start-up, and Service Instruction

NOTE: Read the entire instruction manual before starting the installation.

SAFETY CONSIDERATIONS

Improper installation, adjustment, alteration, service, maintenance, or use can cause explosion, fire, electrical shock, or other conditions which may cause personal injury or property damage. Consult a qualified installer, service agency, or your distributor or branch for information or assistance. The qualified installer or agency must use factory authorized kits or accessories when modifying this product. Refer to the individual instructions packaged with the kits or accessories when installing.

Follow all safety codes. Wear safety glasses and work gloves. Use quenching cloth for brazing operations. Have fire extinguisher available. Read these instructions thoroughly and follow all warning or cautions attached to the unit. Consult local building codes and National Electric
Code (NEC) for special requirements.

Recognize safety information. This is the safety-alert symbol ⚠ . When you see this symbol on unit or in instructions and manuals, be alert to potential for personal injury.

Understand the signal word DANGER, WARNING, or CAUTION. These words are used with the safety-alert symbol. DANGER identifies the most serious hazards which **will** result in severe personal injury or death. WARNING signifies a hazard which **could** result in personal injury or death. CAUTION is used to identify unsafe practices which **would** result in minor personal injury or product and property damage. NOTE is used to highlight suggestions that **will** result in enhanced installation, reliability, or operation.

INTRODUCTION

Model 31KAX Plate Electronic Air Cleaner (EAC) is available in 3 sizes 012 (300 to 1400 CFM), 016 (500 to 1800 CFM), and 020 (700 to 2000 CFM). (See Fig. 1.)

These plate-type air cleaners are designed for use with residential and light commercial forced-air heating and/or cooling systems. They may be installed in a vertical or horizontal section of a typical return-air duct system. (See Fig. 2.)

These air cleaners are easily field-converted from right- to left-hand units. Cabinets are designed to support up to 400 pounds when used in under-the-furnace applications.

CABINET

The cabinet includes an electrical junction box and a power safety interlock, and houses the air cleaner components. These components are:

1. Mechanical pre-filters—Expanded aluminum mesh first-stage filter that removes lint and large dust particles.
2. Cell assemblies—Cells consisting of combined ionizer wires and collector plates.

   Ionizer part of cell has tungsten wires that receive positive charge and are mounted between grounded aluminum channels supported by glazed ceramic insulators.

   Collector part of cell consists of alternately charged collector plates.

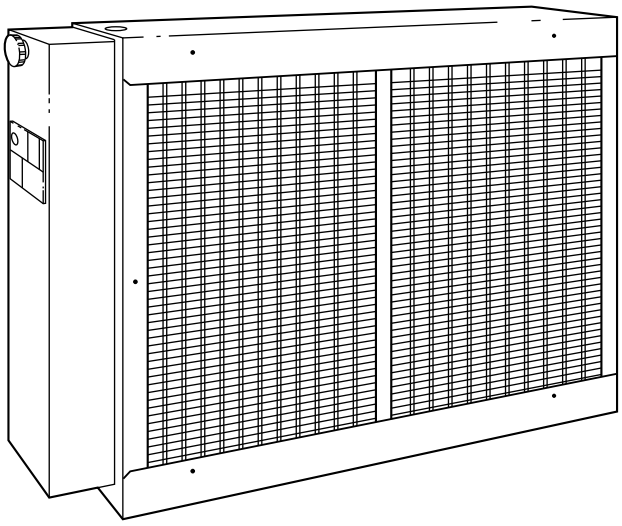

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Fig. 1—Model 31KAX

The EAC components are listed below and shown in Fig. 3.

1. A power door assembly.
2. Two pre-filters.
3. A cabinet containing 2 air-cleaning cell assemblies.
4. A parts bag including electrical bushing, plug buttons, wire chase, and airflow label.

POWER DOOR ASSEMBLY

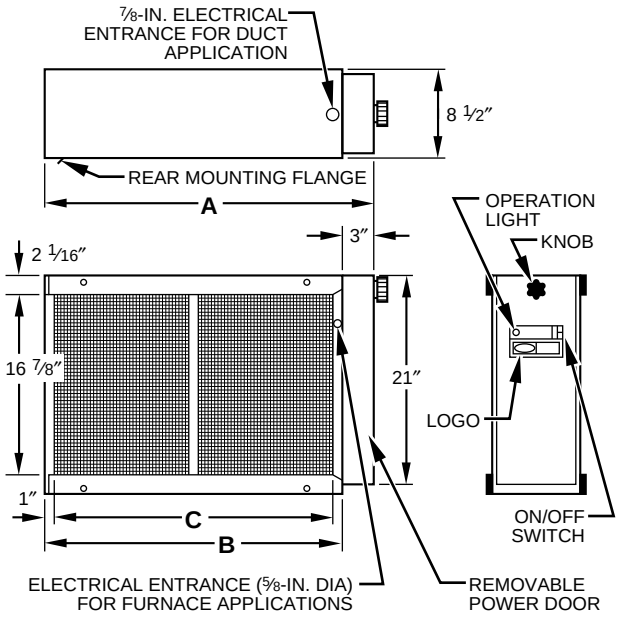
The power door assembly consists of:

1. Unit operation light, ON-OFF switch, and door attachment knob—all installed on door cover.
2. Door base plate contains a solid-state power pack that converts 120vac to high voltage DC (a 240v Conversion Kit, KEAVC0101240 is available). All wiring mounted internally. A line-voltage disconnect (male plug) and high-voltage bus-bar are mounted on the base plate externally. Four screws must be removed to expose the power pack and wiring.

The supply circuit to the power pack, which is wired across the furnace blower motor, is controlled by an ON-OFF power switch. With the power switch ON (assuming power door is in place and blower motor is operating), 120vac ± 10 percent single-phase, 60 Hz power is applied to the power pack (240-V Conversion Kit transformer converts 240v to 120vac). Output of the power pack assembly is approximately 7300vdc.

These Installation Instructions consist of the following:
Step 1—Locating Unit
Step 2—Installation
Step 3—Electrical Connections
Step 4—Startup and Adjustments

Manufacturer reserves the right to discontinue, or change at any time, specifications or designs without notice and without incurring obligations.



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MODEL	A	B	C
31KAX012	24-3/4	21-3/4	19-1/2
31KAX016	27-1/4	24-1/4	22
31KAX020	31-1/2	28-1/2	26-1/4

Fig. 2—Dimensional Drawing

Table 1—Component Information

MODEL	31KAX012	31KAX016	31KAX020
Air Volume Range	300-1400	500-1800	700-2000
Electrical Data (Input to power door)	120v, single phase, 60 Hz	120v, single phase, 60 Hz	120v, single phase, 60 Hz
Electrical Data (Output To Collector Cell)	120v—1.0 milliamps @ 7300vdc		
Approx Ship.Wt. 120v	50	54	57

Note: Using the EAC on air duct systems designed for airflows lower than 300 CFM for 012-size units, 500 CFM for 016-size units, or 700 CFM for 020-size units, is not recommended.

Table 2—Pressure Drop At Various Airflows

31KAX012		31KAX016		31KAX020	
CFM	Pressure Drop (In. wc)	CFM	Pressure Drop (In. wc)	CFM	Pressure Drop (In. wc)
300	0.005	500	0.010	700	0.010
400	0.010	600	0.025	800	0.013
600	0.020	800	0.020	1000	0.018
800	0.030	1000	0.028	1200	0.023
1000	0.050	1200	0.035	1400	0.030
1100	0.060	1400	0.045	1600	0.038
1200	0.065	1600	0.065	1800	0.045
1300	0.075	1700	0.070	1900	0.048
1400	0.085	1800	0.080	2000	0.050

See Service Guide, and Troubleshooting Flow Chart for supplementary information.

Step 1—Locating Unit

Fig. 4 shows the air cleaner in the return-air duct of various furnace installations, with or without air conditioning. Other methods of installing the unit are permissible if the design criteria outlined in this section is observed.

A. PLANNING AN INSTALLATION

When planning an installation, consider the following:

1. Air cleaner is approved only for indoor installation. If outdoor installation is used, unit must be housed in weather-proof enclosure.
2. Air cleaner may be placed in horizontal position on its right or left side or in vertical position on its bottom or back. It must be installed on inlet air side of heating and/or cooling unit. **Be sure that airflow through air cleaner is in same direction as airflow arrows on cells indicate.**

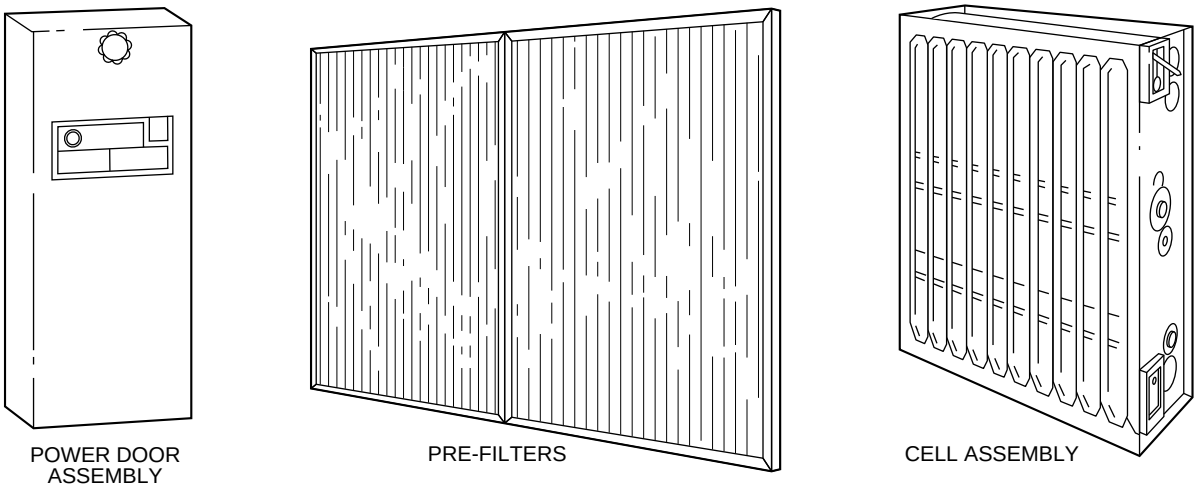

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Fig. 3—View of Major Components

⚠ CAUTION

Cabinets will support a maximum weight of 400 lbs. when installed beneath a vertical furnace or air-handling unit. When setting furnace on cabinet, do not drop it into place. Position furnace correctly on cabinet to prevent a corner from slipping down and damaging cabinet.

3. Allow minimum of 16-in. clearance in front of unit for cleaning and maintenance.

⚠ CAUTION

Never use air cleaner to collect grease or other flammable contaminants.

4. Air outlets and returns must not be blocked with furniture, drapes, or other objects.
5. Air cleaner should be installed where all air circulated by system will pass through it.

B. HUMIDIFIERS

An evaporative, supply-duct-mounted humidifier may be installed without affecting the EAC. A bypass-type evaporative humidifier should be installed so that the moist air does not contact the air cleaner. When an atomizing-type humidifier is used, it should always be installed in the supply-air system.

⚠ CAUTION

If an atomizing-type humidifier is installed upstream from the air cleaner, the efficiency of the electronic cells will be decreased by high humidity, salts, and minerals. Service problems will result.

If the bypass-type humidifier is installed upstream from the EAC, the following precautions should be taken.

1. Humidifier must be installed as far from EAC as possible.
2. A standard, disposable furnace filter must be installed between humidifier and EAC to trap water droplets and mineral salts.
3. Electronic cells of air cleaner must be washed frequently to prevent mineral deposit buildup.

C. OUTDOOR AIR

When outdoor air is added to the return-air duct, sufficient heat must be added to maintain the return-air temperature of 40°F minimum or minimum specified by air handling equipment. Temperatures lower than 40°F can cause ionizer wire failure under certain conditions.

NOTE: The maximum operating temperature of the EAC is 125°F.

Step 2—Installation

NOTE: See Fig. 4 for suggested installation positions.

⚠ CAUTION

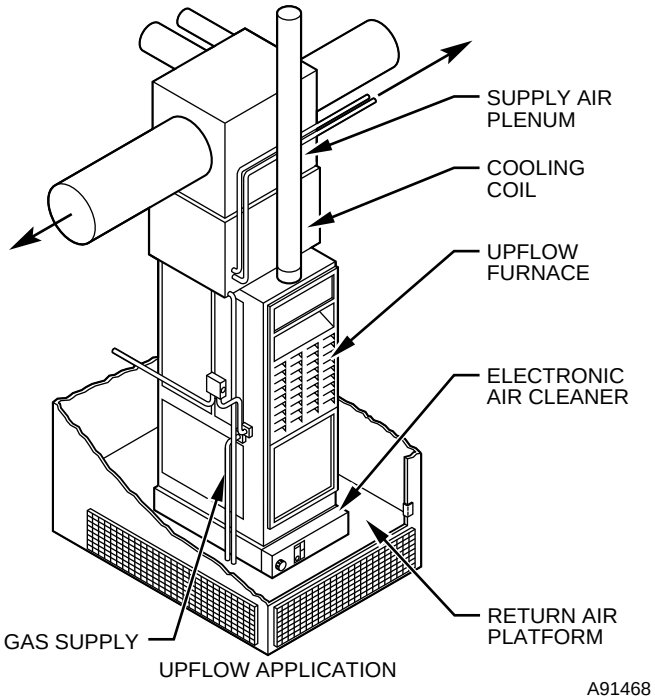
Turn off all power to furnace before beginning any procedures.

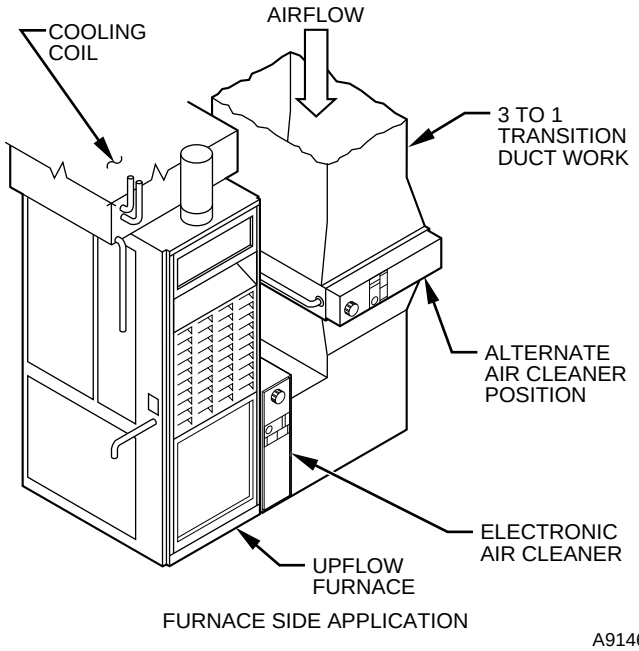
Proceed as follows to install EAC:

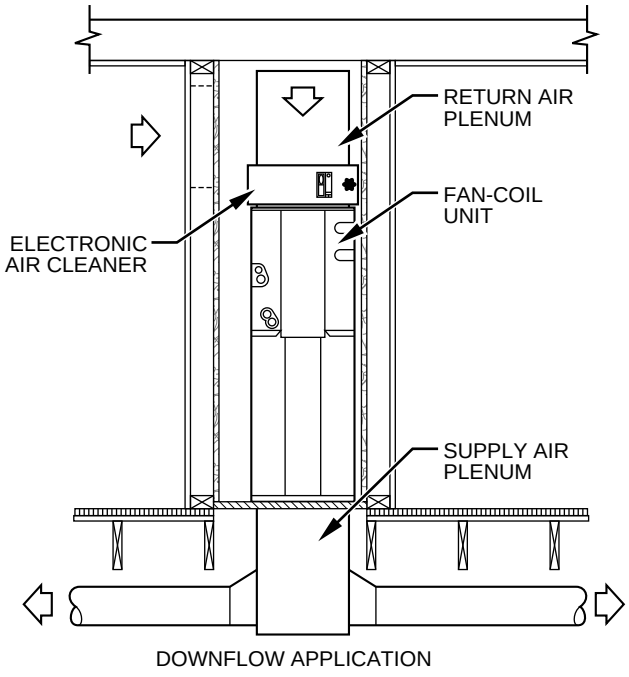
1. Remove and discard existing furnace mechanical filters. They are not required when using an EAC. Thoroughly clean blower compartment of furnace.
2. Move ON-OFF switch to OFF and remove power door by rotating knob (approximately 10 turns counterclockwise) until door is free. Grasp power door by knob and remove it from cleaner cabinet by pulling it towards you. This motion disengages power supply connector.
3. Slide out pre-filters and air cleaner cells.
4. For Model 016 EAC furnace side application, cut open return knockout at the side of the furnace cabinet. For Models 012 and 020, cut opening as shown in Fig. 5—Opening Detail.
5. In order to prevent air leakage, use foam tape provided to attach air cleaner to side of furnace or system blower.

NOTE: The unit is shipped for furnace right side application. For left side application, rotate rear mounting flange 180° by removing 4 screws in the back of the air cleaner. Be sure all 4 screws are in place after the rotation. Relocate the junction box on the furnace to the right side, if required.

6. Hook back flange into the opening. Use air cleaner cabinet front support flange adjacent to the unit as template and drill 2 holes on furnace casing. (See Fig. 6.)
7. Secure the unit by screwing 2 screws provided into drilled holes. (See Fig. 6.)
8. Prepare return-air duct for installation to unit. Return air must use full cabinet opening. Duct should run straight into unit.







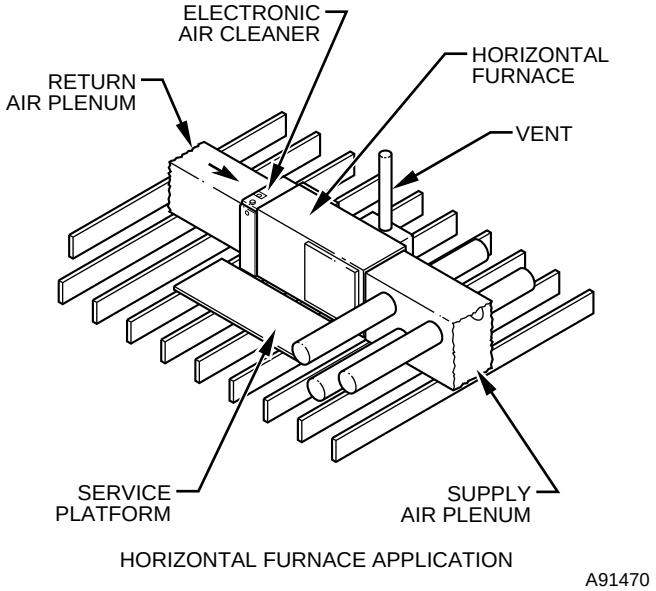


Fig. 4—Typical Applications

⚠ CAUTION

If flanged sheet metal ducts are metal-screwed to the unit casing, do not use screws longer than 1/2 in.

⚠ CAUTION

Airflow across air cleaner must be uniform for best results. Install turning vanes if air cleaner is installed close to an elbow. Depending on size of furnace, it may or may not be necessary to reduce ductwork on leaving-air side of air cleaner. For any application, maintain a 3-to-1 duct reduction ratio (3 in. of duct length for every 1-in. of reduction in size).

⚠ CAUTION

Do not baffle any portion of the entering-air side of the air cleaner.

9. Seal all joints on downstream side of air cleaner to prevent infiltration of contaminated air.

Step 3—Electrical Connections

All wiring must comply with applicable local and national codes. Determine best power wiring routing refer to Section A for Internal Electrical Connections and Section B for External Electrical Connections.

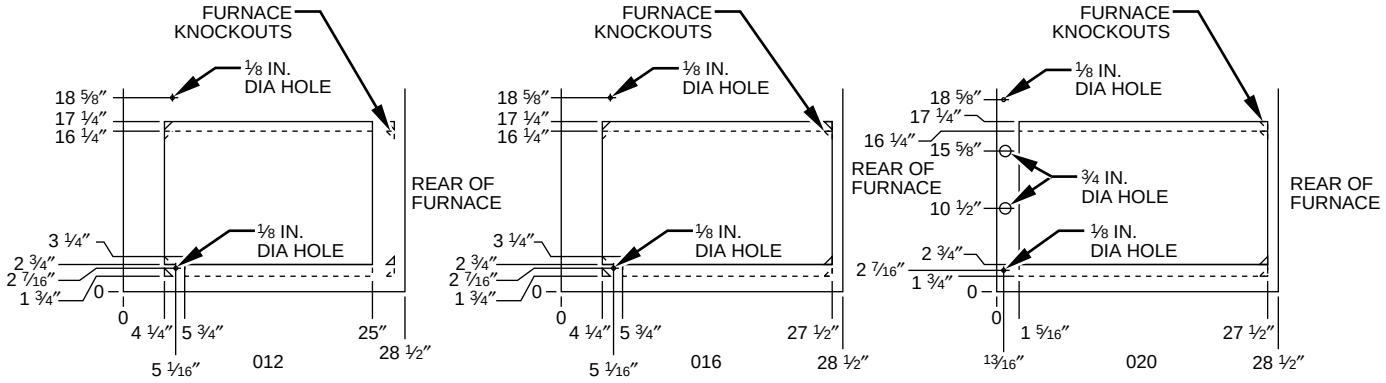


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Fig. 5—Opening Detail

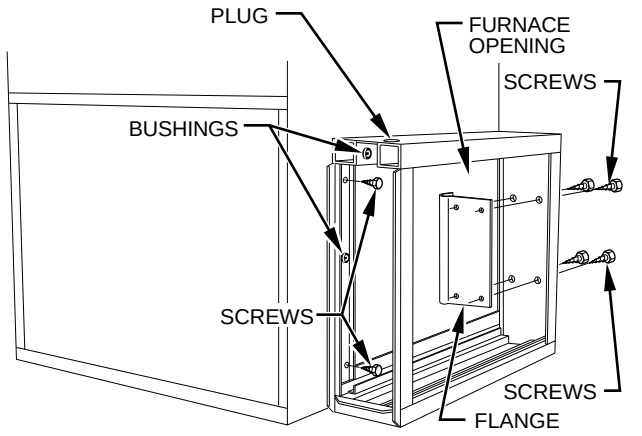

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Fig. 6—Electronic Air Cleaner Installation

⚠ CAUTION

Be sure all incoming power is off before beginning any procedures.

A. INTERNAL ELECTRICAL CONNECTIONS

Proceed as follows to make internal electrical connections.

1. With power door removed, remove junction box cover adjacent to female plug on casing upper channel. (See Fig. 10.)
2. Install protective bushing from inside the air cleaner into the upper hole on the side channel adjacent to the furnace. Be sure bushing projects into furnace opening protecting wires from sharp edges on cabinet opening.
3. Install protective bushing through top rail as shown in Fig. 10.
4. Plug unused hole on top of unit with plug provided in parts bag.
5. Route power wires through bushing channel at top of cabinet, down side channel, and through bushing in side channel and into furnace opening. (See Fig. 10.)
6. Replace cover of junction box.
7. Install wire cover (provided in parts bag) under top flange and secure to side channel with screw provided.
8. Connect power leads as follows:
   a. **Single Speed Furnaces—**EAC is wired in parallel with fan motor. (See Fig. 11.)
   b. **Multispeed Direct-Drive Motor—**If the EAC is wired to a multispeed direct-drive motor, it must be isolated by a relay or sail switch. Use either air cleaner relay P/N P283-1203 or sail switch P/N 69105D1. (See Fig. 12 or 13.)
   c. **Furnaces with Printed-Circuit Boards—**EAC is wired to furnace terminals EAC 1 and EAC 2. See Fig. 14 for wiring connections.
9. Connect ground wire to base unit ground.

NOTE: For non-corporate furnaces, wire unit using conduit and strain relief the wires.

⚠ CAUTION

Be sure all internal wiring connections are tight before power is returned to the unit.

B. EXTERNAL ELECTRICAL CONNECTIONS

1. Attach power supply conduit to hole in top of EAC. Do not use extension cord to connect to electrical power source.
2. Cut EAC wires to 6 in. long. Strip the ends. Using field-supplied wire nuts connect power leads to black and white pigtails extending from female receptacle. (See Fig. 10.)

NOTE: Do not connect aluminum conductor to electrical connections of the EAC. Use copper wire only.

3. Connect power leads as follows:
   a. **Single-Speed Furnaces.** EAC is wired in parallel with fan motor. (See Fig. 11.)
   b. **Multispeed Direct-Drive Furnaces.** If the EAC is wired to a multispeed direct-drive motor, it must be isolated by a relay or sail switch. Use either air cleaner relay P/N P283-1203 or sail switch P/N 69105D1. (See Fig. 12 or 13.)
   c. **Fan Coils.** EAC (120v) MUST be wired to fan coil circuit board terminals EAC 1 and EAC 2, if applicable, ONLY as shown in Fig. 15. Terminals EAC 1 and EAC 2 supply 240vac. Terminal EAC 1 is energized continuously; terminal EAC 2 is energized only with the fan motor.
4. Connect EAC ground wire (green) to appropriate supply ground.
5. Replace cover of junction box.

Single-Speed Furnaces—Wire EAC in parallel with fan motor. (See Fig. 11.)

Multispeed direct-drive furnaces—If the air cleaner is wired to a multispeed direct-drive motor, it must be isolated by a relay or sail switch. Use with either air cleaner relay P/N P283-1203 or sail switch P/N 69105D1 (See Fig. 12 or 13).

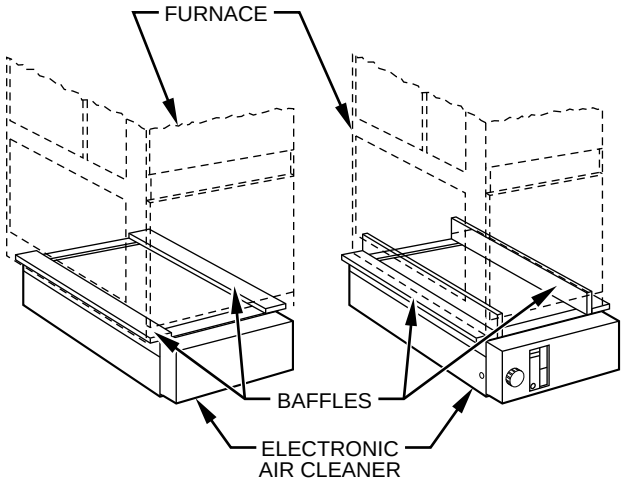

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Fig. 7—Installing Baffles if Needed

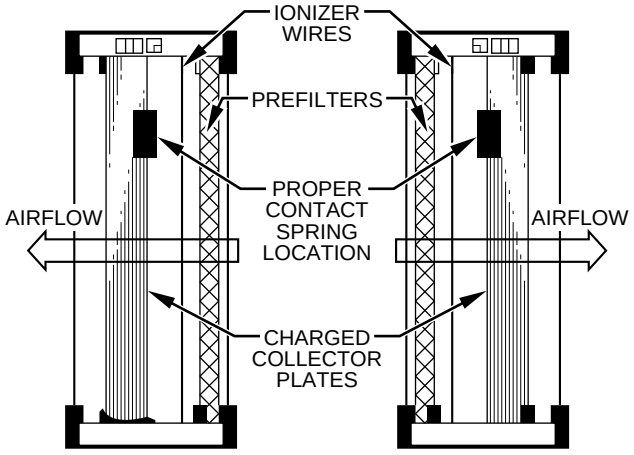

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Fig. 8—Reversing Components for Opposite Airflow

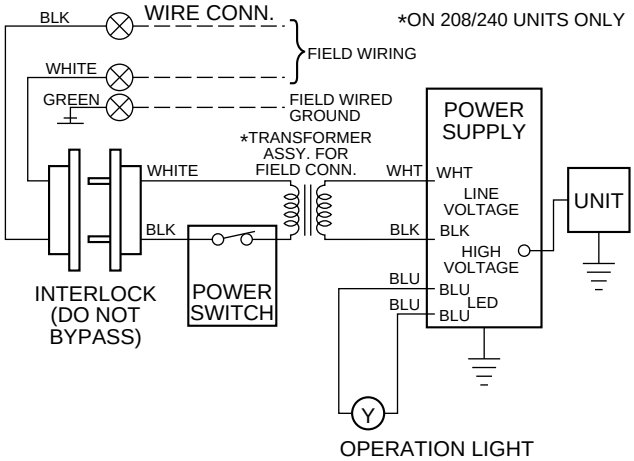

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Fig. 9—Line-to-Line Wiring Diagram

Fan Coils—EAC (120v) MUST be wired to fan coil circuit board terminals EAC 1 and EAC 2 if applicable, ONLY as shown in Fig. 15. Terminals EAC 1 and EAC 2 supply 240vac. Terminal EAC 1 is energized continuously. Terminal EAC 2 is energized only with the fan motor.

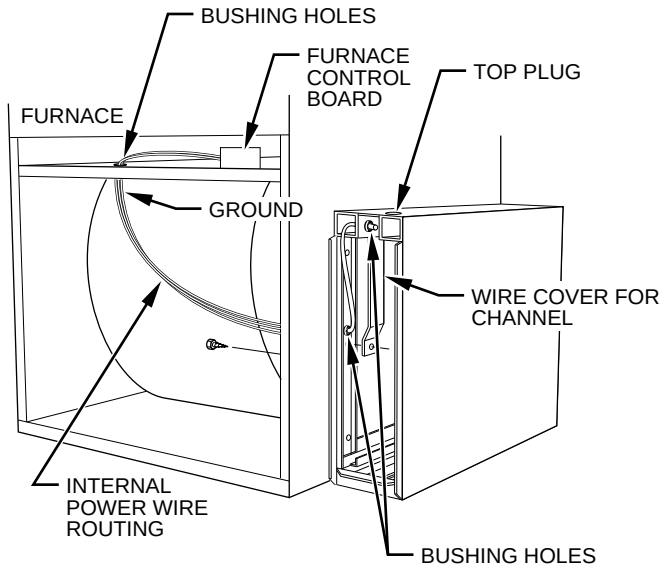

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Fig. 10—Wire Routing

FINAL ASSEMBLY

Kit No. KFAIR0101ACR is offered for use when 24vdc relays may not be available. The kit contains a 24vdc relay which mounts directly inside the EAC cabinet. User supplied 110vac is activated be this relay to power the air cleaner when G or W are present. This preferred connection allows low-voltage wiring to be run between the fan coil and the air cleaner and eliminates the problems of controlling a 110vac air cleaner from the 230v power supplied by the fan coil. (See Fig. 16.)

The ICM2 blower motor used in the FK4B Fan Coil is controlled by low-voltage signals. The familiar 230vac air cleaner control/power signal, EAC 1 and EAC 2, is not available. These signals are replaced by a 24vdc signal which is provided at circuit board terminals AUX 1 and AUX 2. This 24vdc signal is present when either G or W is present and is active in all heating and cooling modes.

In heat pump applications, the G signal is present in both cooling and heating modes, permitting the EAC to be controlled from the G signal only. For the application, a user supplied 24vac relay can be driven by the G terminal, eliminating the need for the relay kit. The selection and mounting of this AC relay is the responsibility of the installer.

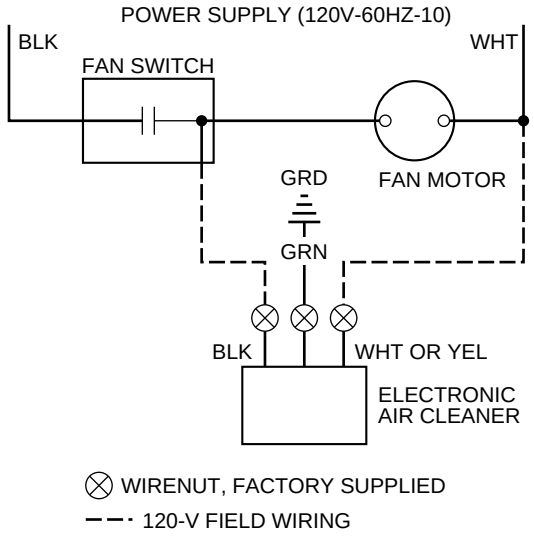

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Fig. 11—Single-Speed Furnaces

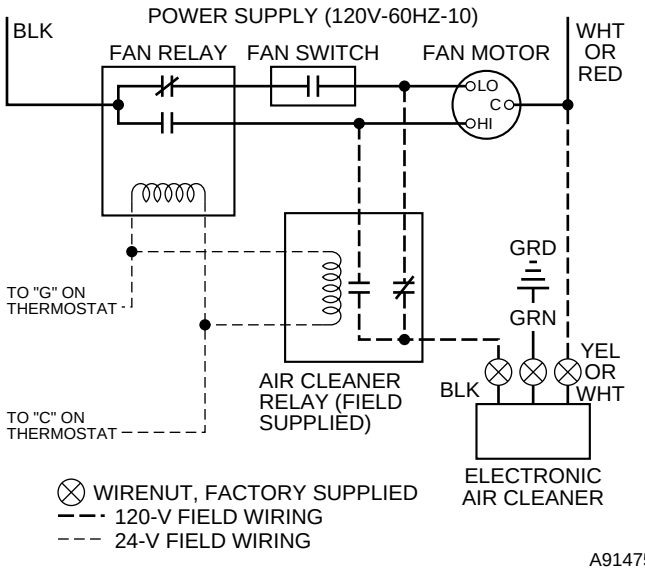

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Fig. 12—Multispeed Direct-Drive Furnaces with Field-Supplied Air Cleaner Relay

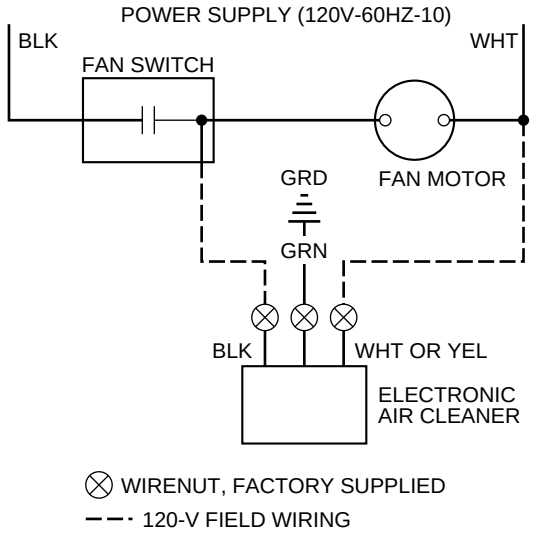

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Fig. 13—Multispeed Direct-Drive Furnaces with Field-Supplied Sail Switch

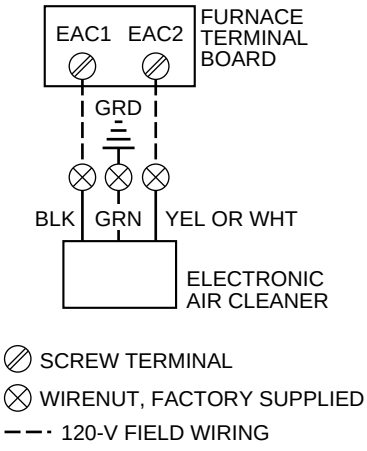

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Fig. 14—Furnaces with Printed-Circuit Board

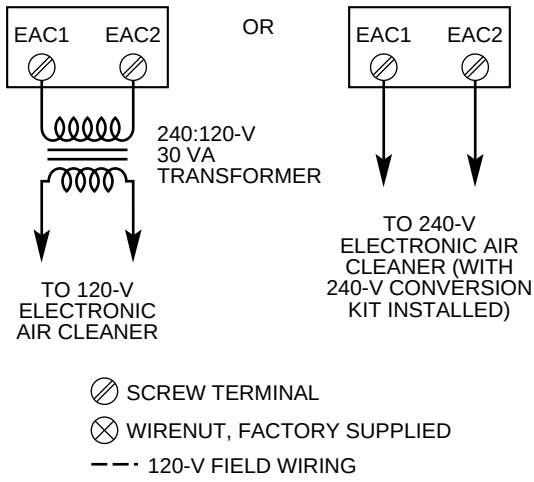

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Fig. 15—Fan Coils with Printed-Circuit Control Board

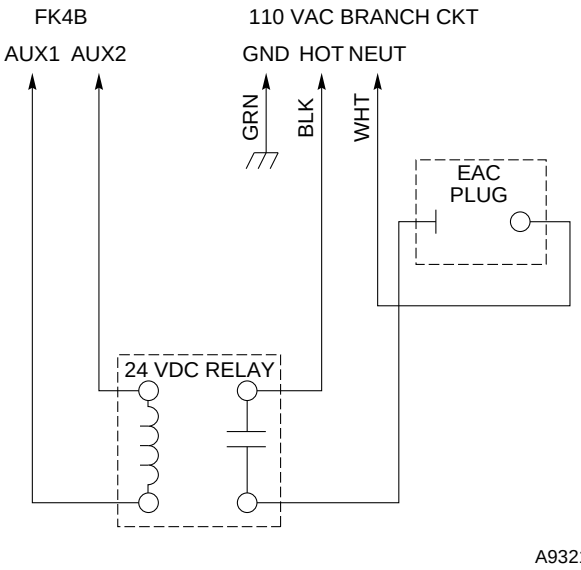

Fig. 16—KFAIR0101ACR Wiring Layout

⚠ CAUTION

Be sure all field electrical connections are tight before power is restored to the unit.

1. Slide pre-filters and air cleaner cells into cabinet.

NOTE: Units are shipped for air entering the right-hand side of the air cleaner. Reverse the position of the pre-filter and the air cleaner cells in the cabinet for air entering the left-hand side of the air cleaner as indicated in Fig. 8. Be sure all airflow arrows are pointing in the direction of the airflow through the air cleaner and that the pre-filter is on the entering-air side.

2. Check contact spring location. Cell contact springs MUST be relocated for **left-hand** units or applications. Remove screw holding contact spring to cells and reinstall at opposite end. (See Fig. 24.) Be sure all airflow arrows are pointing in the direction of the airflow through the air cleaner and that the pre-filters are on the entering-air side.
3. Deform pre-filter guide on side opposite pre-filters to that pre-filters may not be reinstalled incorrectly.
4. Replace power door by first inserting bottom tab into place on bottom edge of door opening. Push top of door and guide door attachment knob screw into threads. Turn knob clockwise until screw engages threads in casing. Turn knob clockwise until door is secure. Ensure good electrical contact between power door and unit components.
5. Unit can be installed with airflow through cabinet in either direction. Apply airflow decal provided to cabinet, observing actual airflow direction. (See Fig. 24.)

Step 4—Startup and Adjustments

The electronic components of the unit convert the incoming vac to vdc power supply. Unfiltered, contaminated air passes through an aluminum mesh pre-filter which removes large air borne particles and distributes the air uniformly across the ionizer-collector assembly. The air passes through the ionizer and is charged with 7300vdc. The ionizer imparts a positive electrical charge to the remaining contaminants. As the air continues through the collector section, the charged contaminants are attracted to the alternately charged collector plates. The charged contaminants are electrostatically held by the collector, purifying the airstream.

1. Ensure that entire EAC is clean, dry, and free of foreign objects.
2. Restore power to system.
3. Move ON-OFF switch on power door to ON position.
4. Set room thermostat to start blower.
5. Check to see if operation light is glowing. This indicates proper power to the cells.

NOTE: Leave these Installation Instructions with the owner to enable to the owner to perform routine maintenance and service.

Step 5—Routine Maintenance and Service

Your new EAC requires periodic maintenance for optimum performance. You may perform this service or have your serviceman handle it for you.

Cleaning of the cell assembly and pre-filter is required 2 or 3 times a year. Frequency will depend on size of home, number of occupants, smoking habits, etc.

The odor of ozone may be noticeable during operation of an EAC. A somewhat higher ozone generation rate during the first week or 2 of operation may be caused by sharp edges on some of the new high-voltage parts. Normal use dulls these sharp edges in a short time.

The odor of ozone is detectable by an average person at levels as low as 0.0030 to 0.010 parts per million (PPM). The concentration of ozone produced in a home by an EAC ranges from 0.006 to 0.020 PPM. Average concentration of ozone in the air of major cities range from 0.020 to 0.040 PPM and even higher. This is well above the level produced by an EAC.

Because normal maintenance (cleaning) is so simple, most homeowners will choose to personally perform the necessary operations.

Clean the unit where dust from air cleaner cells will not soil carpets or floor.

⚠ CAUTION

Before removing the electronic cells, be sure to de-energize the system fan to avoid any possibility of circulating unfiltered air back into the system.

To gain access to the pre-filter and air cleaner cells, simply push power switch to OFF position and remove the power door. Lay it to the side. Pull out the first-stage pre-filters and vacuum from entering-air side, or wash in detergent and water. Allow to dry thoroughly. Reinstall. Do not spray pre-filters with any filter coatings.

A. CLEANING THE CELL

For optimum performance the electronic cells must be washed regularly to remove the dirt cleaned from the air. The required frequency of cell washing varies from one environment to another, depending on a large number of variables. In nearly all cases, the correct period is between 1 and 6 months. Where building infiltration and internal generation of dust is low, as in a smaller home, washing every 5 or 6 months may be adequate. Where there is considerable infiltration, cooking, dust, and tobacco smoke, more frequent washing will be required. If a heavy buildup of dirt is found on the collector plates or the cell is not clean after washing, it should be cleaned more often. If there is only light dirt on collector plates, the period between washing can probably be lengthened. The electronic plate cells may be washed a number of different ways, depending on home-owner preference.

1. Automatic Dishwasher Washing—The easiest and most convenient way to remove the accumulated dirt from the plate-type electronic cells is to wash them in an automatic dishwasher.

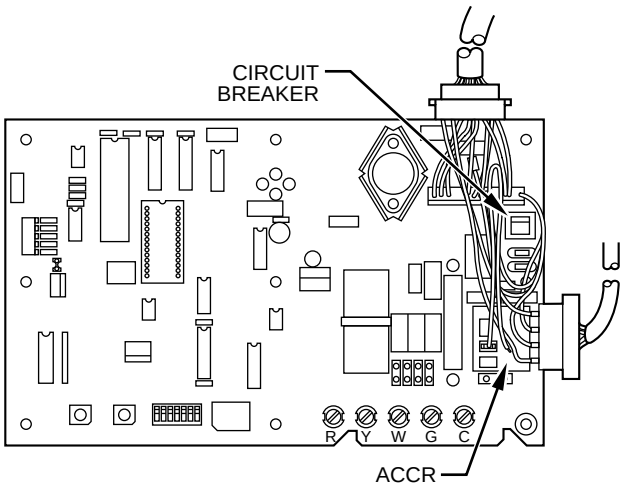

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Fig. 17—EAC Connection to Electronic Condensing Upflow Gas Furnace

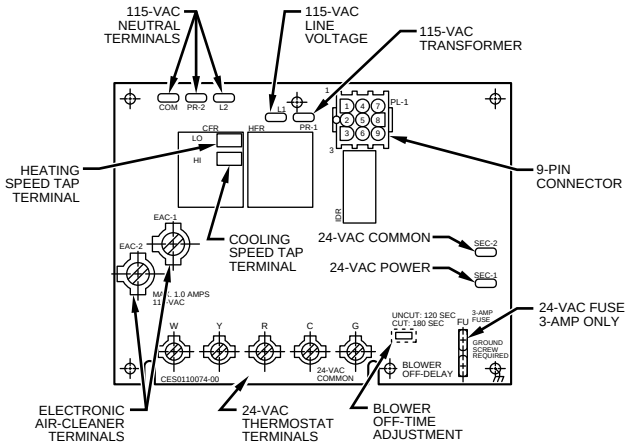

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Fig. 18—EAC Connection to Continuous Pilot Gas Furnace

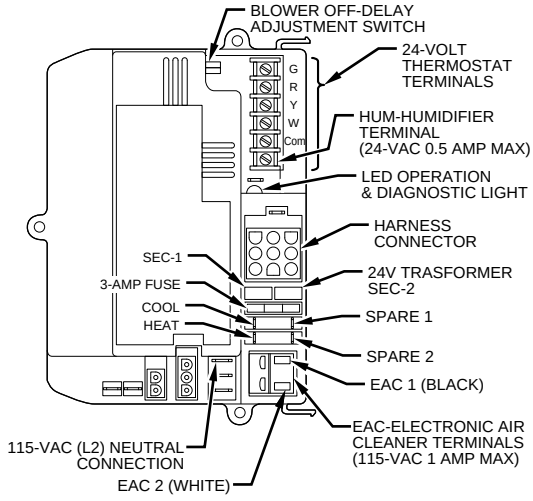

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Fig. 19—EAC Connection to Multipoise Fixed Capacity Furnace Control Board

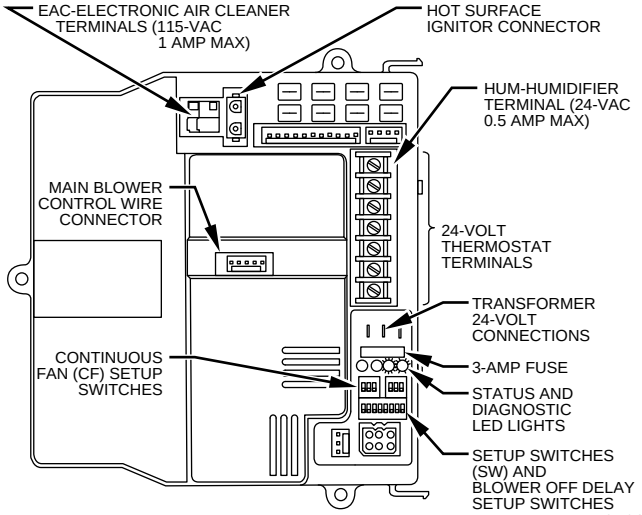
EAC-ELECTRONIC AIR CLEANER TERMINALS (115-VAC 1 AMP MAX)
HOT SURFACE IGNITOR CONNECTOR
HUM-HUMIDIFIER TERMINAL (24-VAC 0.5 AMP MAX)
MAIN BLOWER CONTROL WIRE CONNECTOR
24-VOLT THERMOSTAT TERMINALS
TRANSFORMER 24-VOLT CONNECTIONS
CONTINUOUS FAN (CF) SETUP SWITCHES
3-AMP FUSE
STATUS AND DIAGNOSTIC LED LIGHTS
SETUP SWITCHES (SW) AND BLOWER OFF DELAY SETUP SWITCHES

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Fig. 20—EAC Connection to Multipoise Variable Speed Furnace Control Board

a. Place electronic cells on sides with ionizer section down (airflow arrows pointing up) on lower rack of dishwasher.

⚠ CAUTION

Use care to avoid damage to the collector plates when placing the cells in the dishwasher.

NOTE: For some dishwashers with a center spray arm, it may be necessary to remove the top basket to fit one or both cells inside.

b. Use detergent in accordance with dishwasher manufacturer's instructions.

c. Allow dishwasher to run through its complete wash cycle. You may also allow it to run through its complete dry cycle, although this is not necessary.

⚠ CAUTION

The electronic cell will be very hot at the end of the dishwasher's cycle. Allow it to cool before handling. Hot water may accumulate in the tubes supporting the collector plates. Tip the cells to drain tubes.

d. Dry cells completely before turning on power to air cleaner. This can be done by replacing cells in cabinet and turning on system fan continuously for approximately 30 to 60 minutes before restoring power to air cleaner.

e. With some dishwashers it may be necessary to re-run complete cycle or rinse cycle after cells are removed if homeowner notices dirt stains or residue inside dishwasher.

2. Manual Washing—The electronic cells may be washed manually by soaking them in a solution of automatic dishwasher detergent.

a. Provide suitable container large enough to hold one or both cells.

b. Select automatic dishwasher detergent that dissolves readily in hot water. Depending on local water conditions, some brands may form a precipitation or scum. If a noticeable scum floats to surface, try another brand. The brand the homeowner finds gives the best results in his dishwasher will probably give best results washing the electronic cells.

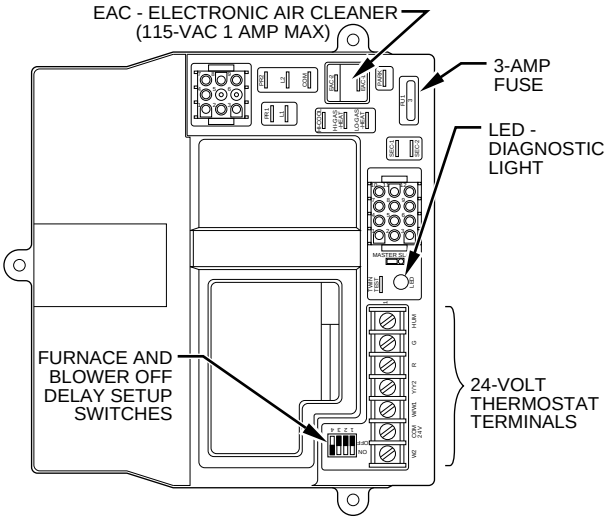

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Fig. 21—EAC Connection to 2-Stage "C" Furnace Control Board

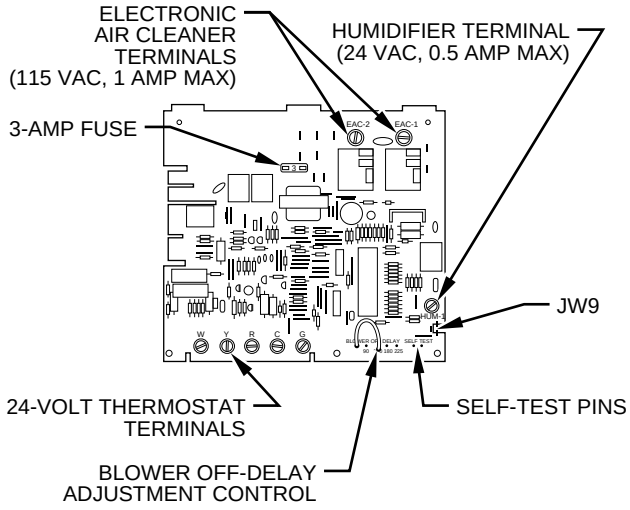

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Fig. 22—Internal Furnace Electrical Connections for EAC

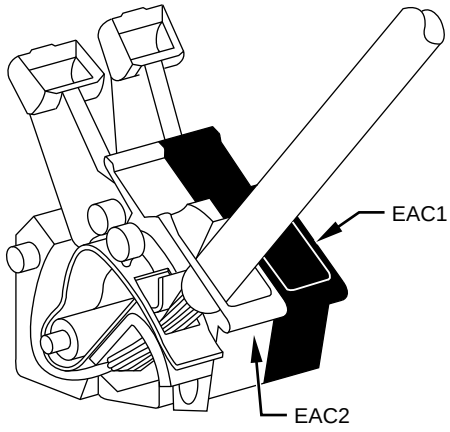

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Fig. 23—EAC Terminals on Control Center

⚠ CAUTION

Do not splash detergent solution in eyes, and avoid prolonged contact with skin. Keep detergent and solution out of reach of children.

c. Before placing cells in washing container, pour in detergent. Use approximately 3/4 cup per cell if container is about size of cell. Add enough very hot water to cover cell(s).

d. After detergent has completely dissolved, place electronic cell(s) in container.

e. Soak cells for 15 to 20 minutes, slosh several times, and remove.

f. Rinse cells with fine water spray.

g. Fill wash container with clean, hot water and soak cell(s) for 5 to 15 minutes.

h. Remove cell(s) and let water drain. If water draining from them feels slippery, detergent still remains. Repeat rinsing until water from them no longer feels slippery. Inspect for cleanliness.

i. When both cells have been washed and thoroughly rinsed, check cells from broken wires and bent collector plates. If none are found, replace electronic cells and pre-filter in cabinet. Observe proper airflow arrows on cabinet and cells.

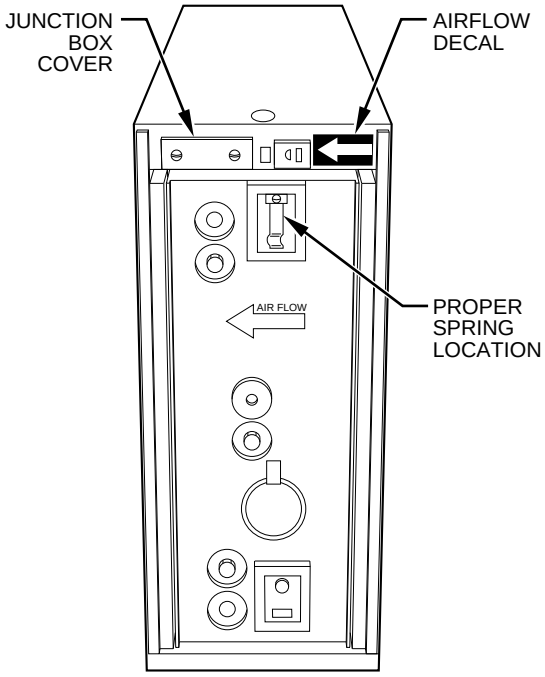

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Fig. 24—Final Assembly Detail

j. Dry cells completely before turning on power to air cleaner. This can be done by turning on system fan continuously for approximately 30 minutes before turning on power to air cleaner.

SERVICE GUIDE

⚠ CAUTION

Procedures in this section should be performed only be qualified service personnel.

⚠ DANGER

Electrical shock can cause injury or death.

1. During troubleshooting procedures, dangerous line-voltage circuits are exposed. Use care to avoid hazard of electrical shock or damage to equipment.

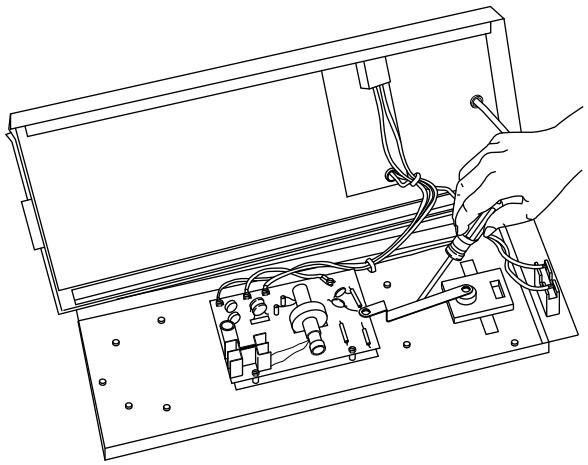

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Fig. 25—Checking 120-V Power Pack

2. Although not lethal, high-voltage output of power supply can produce painful shock.
3. Be sure to properly ground air cleaner and its components before testing.
4. Do not touch any portion of air cleaner when energized.

TOOLS AND EQUIPMENT

Servicing the EAC can be accomplished with only a few tools:

1. Screwdrivers: Long shank, plastic or rubber handles (2 required).
2. Needle nose pliers for stringing ionizing wires.
3. High-voltage jumper cord.
4. High-voltage tester: range to 12 KVDC (DC voltage probe recommended).
5. Grounding wire.

Step 1—Electrical Troubleshooting Guide

The following troubleshooting procedure is a simplified approach to aid service person in repairing any malfunction in the EAC. By following this troubleshooting procedure and operation light, the malfunction can be isolated to certain areas in the EAC.

NORMAL OPERATION

For normal operation of an EAC, the system blower should be running and the air cleaner switch should be ON. This will allow the unit to be energized and cause the light on the power door to glow. Occasional arcing by an EAC is normal (the light on the power door will flicker). This can result when lint or large particles of dirt are not stopped by the pre-filters. The dirtier the EAC becomes, the more likely occasional arcing will occur. Continuous arcing may indicate cleaning is necessary. The EAC should operate only when the system blower is running.

ISOLATING MALFUNCTIONS

Switch on the EAC and energize the blower system. If the light does not glow, remove the cells and replace the door. If the light glows with the cells removed, the problem is within the cell or cabinet. Proceed to items 1 through 3. However, if the light does not glow, proceed to items 4 through 10.

It may be necessary to perform items 1 through 3 after completing items 4 through 10.

1. Check spring on cell to see if it is bent, sprung, or deformed. Check to see that it makes good contact with door. (Repair or replace.)
2. Check male and female plug and receptacle and associated wire connection on power door and cabinet for damage and proper wiring.
3. Visually inspect air cleaner cells, visually inspecting for:
   a. Heavy dirt accumulation (Wash cells—see Cleaning The Cell section.)
   b. Bent collector plates (straighten if necessary).
   c. Broken ionizer wires (replace if necessary).

   Check to see that ionizer springs are seated properly in place. Improper seating may cause arcing.
   d. Ionizer springs broken or bent (replace if necessary).

   Check to see that ionizer springs are seated properly in place. Improper seating may cause arcing.
   e. Insulators cracked or broken (replace if necessary).

   Deterioration of metal around insulator indicates defective insulator (Replace insulator).
   f. Ionizer grid deformed (repair or replace as necessary).

   Check for short between high-voltage contact (found in center of rectangular ceramic insulator) and frame of cell, with ohmmeter. Resistance should be infinite (open circuit).

   If the light does not glow when cells are removed:
4. Remove power door from unit and check for power to air cleaner cabinet. This can be accomplished with a volt meter. Being careful to avoid electrical shock, check output at the receptacle with voltmeter. Reading should be approximately 120v (240 for 240-v conversions).

During normal operation, power to the cabinet should only be activated while system blower is operating. To avoid building up an undesirable concentration of ozone DO NOT operate EAC when blower is off.

5. Disconnect voltage and remove access panel on power door and visually check to see that all wire connectors are firm and that wires are not broken. Repair or replace with 18-gauge wire minimum.
6. Inspect ceramic insulators for dirt or damage. Clean or replace. Deterioration of metal around insulator indicates defective insulator (Replace as necessary).

   Inspect for visual damage.

⚠ WARNING

A possible shock hazard exists. Do not allow arcing for a prolonged period of time. The power supply output can be checked with a high-voltage voltmeter. The output should read between 9000 and 11000 vdc. If the output is below 7500 vdc, replace the power supply.

7. Check switch and light circuit by applying electrical power to plug on power door. This can be accomplished with jumpers from cabinet receptacle. Attach grounding wire between power door base and cabinet.

⚠ WARNING

A possible shock hazard exists. Be careful not to short out the power supply. The buss bar and contact plate carry live high voltage current on — 7300vdc, 1 MA.

The LED light circuit output can be checked with a voltmeter. The reading should be 4vac.

8. Check power supply.
   a. Place screwdriver on ground plate (access panel). At the same time move shank portion of screwdriver towards high-voltage output of power supply. If arcing occurs when

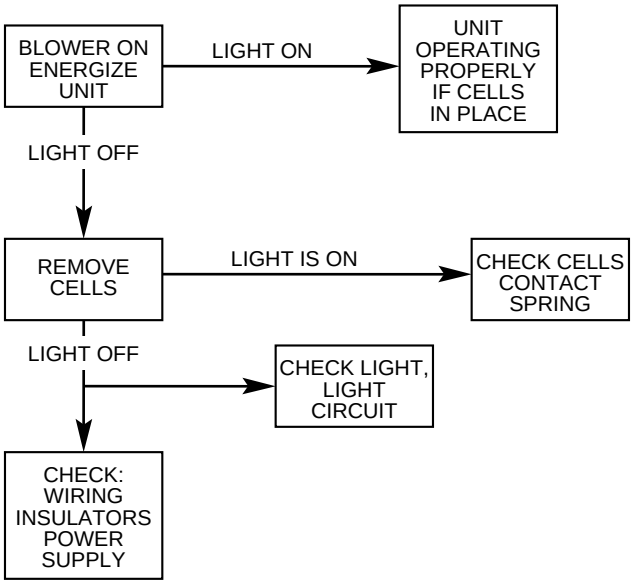

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Fig. 26—Electrical Troubleshooting Flow Chart

screwdriver comes within approximately 1/8 in. of power supply, power supply is operating properly. If no arcing occurs, power supply is defective. Replace power supply.

b. Use high voltage tester. Voltage output should be between 9000 and 11000vdc.

Electrical Troubleshooting Flow Chart

PROBLEM	POSSIBLE CAUSES	REMEDY
Operation light off	Shorted cells. Defective light. Defective power supply.	See Electrical Troubleshooting Guide section.
	Blower not operating.	Energize blower.
	Cells wet either due to high humidity or from washing.	Cells will dry.
Unit snaps or arcs continuously	Line voltage too high.	Adjust line voltage.
	Cells need cleaning.	Clean cells.
	Broken ionizer wire.	Replace wire.
	Broken contact spring on cell.	Replace spring.
	Broken insulator in cell.	Replace insulator.
	Broken insulator in power door.	Replace insulator.
	Foreign material lodged in ionizer or between plates.	Remove object.
	Bent plates.	Straighten.
Humming noise	Improper wiring connections.	Correct
	Loose ionizer wires.	Replace or repair.
	Ionizer wires not centered.	Center wires between plates.
	Excessively dirty ionizer or collector.	Clean.
	Deformed contact spring on cell.	Adjust spring.
Air cleaner does not clean dirt	Lock of power to cells because of improper alignment of contact spring cells to power door.	Adjust alignment or replace spring.
	Defective interlock plug or receptacle.	Replace
	Air volume too great.	Reduce air volume to design CFM.
	Leaks in ductwork on clean air side of air cleaner.	Seal.
	Dirty air not being delivered to air cleaner.	Check return-air grilles for obstruction by furniture, drapes, etc. Remove.
	Uneven air distribution across face of unit. Uneven air distribution across face of unit my be indicated by uneven loading pattern of dirt in collector section of air cleaning cells. The entering-air side of collector stage should be evenly covered with dirt. In the case of the two cell units, each cell should have an even loading pattern.	Install turning vanes of air baffles. CAUTION: Do not block off any of the entering-air side opening to the unit.
Radio or TV interference	Accumulation of foreign particles lodged in ionizer section	Remove.
	Unit improperly grounded.	Provide good ground to power pack.
	Ground line of supply line voltage not properly grounded.	Correct.
	Loose ionizer wires.	Replace.
	Loosely connected components or primary-voltage wiring.	Tighten.
	Defective power pack.	Replace.
	Dents in collector section or ionizer section.	Straighten.
	Improper contact between power door and cells.	Adjust alignment of contact spring.
	Weak-station/poor ground.	Add E.M.I./R.F.I. filter in power line.
	Defective insulator.	Replace.
White dust on furnishings	This dust can be described as "clean dirt" and is composed mainly of lint, which because of its weight settles out of the living space before it reaches the air returns. It is "white" because the submicron dirt particles, which normally would color it and render it invisible, have been removed from the air space.	This problem requires no solution. It is visible evidence that the air cleaner is cleaning up the staining and soiling dirt particles from the living space.
Ozone odor	Initial break-in period may have a noticeable ozone odor.	See Maintenance and Routine Service section.
	Air volume too low.	Increase air volume to design CFM.
	Uneven air distribution across face of unit.	Ensure full opening of return-air is used. Do not block off any part of return surface area.
	Air cleaner oversized for application.	Size air cleaner per design CFM rating.
	Air cleaner not shutting off during blower off cycle.	Check wiring and ensure that the air cleaner does not operate when blower is off.

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Book 1 4 Tab 7a 9a PC 101 Catalog No. 533-135 Printed in U.S.A. Form 31KAX-9SI Pg 14 6-94 Replaces: 31KAX-8SI